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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/997,219	11/30/2001	Mark J. Davis	SGT-50	2552
23599	7590	02/24/2004	EXAMINER	
MILLEN, WHITE, ZELANO & BRANIGAN, P.C. 2200 CLARENDON BLVD. SUITE 1400 ARLINGTON, VA 22201			JAGAN, MIRELLYS	
			ART UNIT	PAPER NUMBER
			2859	

DATE MAILED: 02/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/997,219

Applicant(s)

DAVIS ET AL.

Examiner

Mirellys Jagan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/3/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-14 is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of claims 1-10 is withdrawn in view of U.S. Patent 5,384,877 to Stone. Rejections based on the previously cited reference(s) follow.

Claim Objections

2. Claims 1-14 are objected to because of the following informalities:

Claims 1, 11, and 12 appear to state that the coefficient, i.e., one coefficient, is obtained from the differences between the positions of multiple frequencies at the two or more temperatures, i.e., that one coefficient is obtained using the positions of multiple frequencies. This makes the claims unclear since the specification discloses that the coefficient is obtained from the difference between the position of a single frequency at the two or more temperatures, (see equation (4) and figures 8a and 8b) and that multiple coefficients can be calculated using the differences between the positions of multiple frequencies at the two or more temperatures in order to improve accuracy.

In claim 6, there is lack of antecedent basis in the claim for measuring the difference between respective frequency peak positions, as stated in lines 2-3.

Claims 2-5, 7-10, 13, and 14 are objected to for being dependent on an objected base claim. Appropriate correction is required.

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Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,384,877 to Stone in view of the prior art disclosed by Applicant on pages 2-3 and page 5, lines 8-11 of the specification [hereinafter Prior Art].

Stone discloses a prior art Fabry-Perot etalon comprising a solid material placed between two flat reflective end plates of a different material. The etalon has an optical path consisting of the material and the flat plates. Stone discloses that it is known in the art that the optical length of a Fabry-Perot etalon changes as a function of temperature, measuring the resonant frequencies of a material forming the Fabry-Perot etalon since the resonant frequencies change as a function of temperature, that the length of the material forming the Fabry-Perot etalon changes as a function of temperature, and provides calculations for determining the optical length by using equation (1) shown in column 2, line 25. Stone discloses that the optical length of the etalon is an important parameter that needs to be known in order to tune the etalon when the temperature changes so that the etalon functions properly as a filter. Also, Stone teaches that the resonance can be expressed in wavelengths. Stone teaches that it is useful to know the thermal expansion coefficient of the material in order to obtain the optical length of the etalon since the optical length of the etalon is a function of the thermal expansion coefficient of the material (see figure

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1; column 1, lines 45-48; column 2, lines 11-41; column 3, lines 61-63; and column 4, lines 10-15).

Stone does not disclose obtaining the thermal expansion coefficient by determining the position of the resonant frequencies at each of two or more temperatures and calculating the coefficient from the difference in the frequencies at the two or more temperatures; calculating the change in the length of the material by using the equation $\Delta\nu = (-\nu/L)\Delta L$; the peak positions being in the range of 1300-1700 nm; the surfaces having a flatness of $\lambda/20$ or better and <0.5 arc second parallelism or better; having 10 or more peak positions; and the etalon having a finesse between 1-1000.

It is known in the Prior Art that the position of resonant frequencies of a material forming a Fabry-Perot etalon is a function of the length of the material (the length being known to be a function of temperature), i.e., a temperature change will cause a change in the position of resonance frequencies of the material (resonant frequencies must be measured at their peak in order to obtain the position of the frequencies). The Prior Art calculates the change in the position of the frequencies ($\Delta\nu$) or the change in the length (ΔL) by using the equation $\Delta\nu = (-\nu/L)\Delta L$, and teaches that the optical length of the etalon is a function of the thermal expansion coefficient of the material. It is also known in the Prior Art that etalons having surfaces with a flatness of $\lambda/20$ or better and <0.5 arc second parallelism or better, and a finesse of 1-1000, are commercially available, and that NIST standards teach that it is known that etalons can have resonant frequencies in the range of 510-1540 nm having 30 or more frequency positions.

Referring to claim 1, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the measuring of the resonant frequencies of Stone by

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also measuring the change in the position of the resonant frequencies of the material as the temperature changes to determine the change in length of the material, as taught by the Prior Art, as the temperature changes to obtain the change in length of the material as the temperature changes, i.e., the thermal expansion coefficient of the material, since Stone teaches that the thermal expansion of the material is useful for obtaining the optical length of the etalon.

Referring to claims 7-10, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to provide an etalon having peak positions in the range of 1300-1700 nm, surfaces having a flatness of $\lambda/20$ or better and <0.5 arc second parallelism or better, creating 10 or more frequency positions, and a finesse of 1-1000, since it is known from the Prior Art that etalons of materials having such qualities are commercially available and known from NIST standards to one having skill in the art, and since it has been held that, where the general conditions of a claim disclosed in the prior art, discovering the "optimum range" involves only routine skill in the art. See *In re Aller*, 105 USPQ 233 (CCPA 1995).

Allowable Subject Matter

5. Claims 11-14 would be allowable if rewritten an amended to overcome the objections set forth in this Office action.

6. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or suggest the following in combination with the remaining limitations of the claims:

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A method for determining the thermal expansion coefficient of a substance, the method comprising the step of determining the absolute positions of multiple resonant interference peaks of a Fabry-Perot etalon by simultaneous reference to a standard having multiple fiducial marks, which are overlaid onto etalon-based resonances (see independent claims 11 and 12).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

7. Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mirellys Jagan whose telephone number is 703-305-0930. The examiner can normally be reached on Monday-Thursday from 8AM to 4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 703-308-3875. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJ
February 20, 2004



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